

Redescription of *Cypraea tigris lyncichroa* MELVILL, 1888

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(Plate 11)

The subspecies *Cypraea tigris lyncichroa* was described by Melvill in 1888. By subsequent consideration the existence of this shell as such has been questioned, and as a valid subspecies rejected (Iredale, 1939). There is a convincing basis for this action, as the true identity of the subspecies is obscure and confusing because of the inadequacy of its original description. While there is a lot of merit in Iredale's opinion, he undertook to do nothing about it. The purpose of this paper is to substantiate that such a form exists in Polynesia, to redescribe the subspecies, preserving Melvill's name for it, and to designate a hypotype.

Cypraea tigris tigris, Linnaeus, 1758, has a wide distributional range which extends eastward from the East African type locality to the Hawaiian Archipelago, and on a north-south axis from Japan to Australia.

In 1795 Shaw described a subspecies of *Cypraea tigris* which he called *C. tigris pardalis*. Since then, it has been established that this race ranges from Japanese waters through the Philippine-Sulu Sea area, Central Malaysia and the Andaman Islands to Northwest Australia. It was not until nearly one hundred years later that Melvill, while sorting over an accumulation of these shells from the central Pacific area, decided that there were enough color differences among them to permit subspecific classification. Thus, from a variety of dorsal color and design combinations, now known to be characteristic of this species as a whole, there appeared seven carefully chosen "varieties". These were:

- a. *Cypraea tigris flavonitens*
- b. *Cypraea tigris hinnulea*
- c. *Cypraea tigris russonitens*
- d. *Cypraea tigris chionia*
- e. *Cypraea tigris lyncichroa*
- f. *Cypraea tigris ionthodes*
- g. *Cypraea tigris zymecrasta*

Of these, *C. tigris lyncichroa* is being given special consideration here, the remainder being relegated to synonymy with *C. tigris tigris*.

In describing this subspecies, Melvill wrote only this: "... spotted and colored with blue and fawn pattern resembling *C. lynx* (Linnaeus), dorsal sinus reddish, very distinct, shell usually rather stunted, and smaller than other forms, sides and base white." Of the seven described varieties, this is the only one in which a reference was made to the shell itself rather than just the color and pattern — a reference which is applicable to almost any specimen one would stop to consider.

Melvill's descriptions make it practically impossible to associate them with any particular given population of *Cypraea tigris*. The color patterns of this species are notably variable, and, except for rare instances, can in no way be attributed to disease as has been suggested by Iredale. *C. tigris*' great range of color variability can be compared with the well-known examples of *Oliva miniacea* Röding, 1798 and *Mitra vulpecula* Linnaeus, 1767.

Among the many names proposed by Melvill, it is not clear how that of *lyncichroa* survived. His description is taxonomically too vague to be applicable to a specific population of mollusks, for the very reason that color forms and stunted specimens appear in every large population of this species. Even Melvill must have had a feeling of frustration in working with this group, when he said of his *Cypraea tigris chionia*: "This runs into *C. tigris flavonitens* frequently."

These superficially described characters could hardly have influenced Schilder (1939) in his choice of this inadequately established subspecies to represent the central Pacific populations of *Cypraea tigris*. It is difficult to understand why this subspecific name was chosen, with no more basis than this nebulous description.

I made as complete an analysis as possible of the color and morphological affinities of *Cypraea tigris*, tracing its growth patterns, its color forms, and its distribution from its East African type locality through Shaw's range of *C.*

tigris pardalis and on into its final stand in the northeastern Pacific. Until it reaches Hawaii, its actual morphological changes are few. However, very obvious differences in its general makeup become clearly apparent as the cline approaches its eastern terminus in the Hawaiian Archipelago. There is a unique natural element of ecological isolation to be observed in these islands that has been amply manifested in other molluscan genera found there.

Specimens from intermediate collecting stations westward were carefully considered for separating characters that would distinguish them from others, and except for the Hawaiian population, little variation was evident among them.

GENUS: *CYPRAEA* Linnaeus, 1758

SUBGENUS: *Cypraea* Linnaeus, 1758

Species: *tigris* Linnaeus, 1758

Subspecies: *lyncichroa* Melvill, 1888

Cypraea tigris lyncichroa (Melvill, 1888) (Plate 11, figs. 1 and 2); Mem. Proc. Manchester Soc., Ser. 4, Vol. 1, No. 5, p. 212. "*lyncichroa* (var. nov.). Spotted and coloured with blue and fawn

in pattern resembling *C. lynx* (L.), dorsal sinus reddish, very distinct; shell usually rather stunted, and smaller than the other forms, sides and base white."

I wish to expand this description as follows: Shell large, heavy, pyriformly ovate, acutely humped dorsally, bulbously inflated, posteriorly umbilicate; margins not obviously thickened, sides a continuous symmetrical curve from dorsum to base; extremities somewhat produced; base and lip sloping inward to denticles; aperture wide, straight, curving sharply left posteriorly; neither labial nor columellar teeth extend onto base. Labial teeth strong, wide, flattened, short; interstices deeply channeled, rounded; columellar teeth longer, finer, thickening pointedly on ventral columellar ridge and extending unbroken across fossula; fossula broad, increasingly concave anteriorly; terminal ridges hardly oblique; primary shell surface white or light beige, thickly covered with brownish-black spots which are superimposed upon larger blue spots formed in an earlier stage of development; base and teeth pure white; an orange-brown mantle line traverses the length of the right dorsum.

Table 1: Comparison Between Three Subspecies of *Cypraea tigris*.

Morphological Features	<i>tigris lyncichroa</i>	<i>tigris pardalis</i>	<i>tigris tigris</i>
Size Formula	126 (70) 21: 24	78 (71) 18: 16 *	89 (69) 17: 17*
Average Shape	Pyriformly Ovate, Humped	Ovate	Inflatedly Pyriform
Margins	Symmetrically Rounded	Less Angular	Regularly Rounded
Aperture	Wide	Less Wide	Wide, Sinuous
Lip	Generally Straight	Rather Declivous	Less Declivous
Labial Teeth	Broad, Flattened	Rounded, Short	Rounded, Lengthened
Columellar Teeth	Fine	Coarse	Often Slightly Finer
Fossula	Deeply Concave	Less Concave	Shallow
Fossular Denticles	Distinct, Continuous	Less Accentuated	Indistinct
Dorsum	White, Occasionally Cream	Mostly White	Often Yellowish
Dorsal Spots	Medium Distinct, Seldom Fused	Large, Often Fused	Smaller, Generally Fused
Base and Teeth	White	White	White

* Average Measurements, Schilder (1938).

Cypraea tigris lyncichroa differs morphologically from *C. tigris tigris* by its large size and heavier shell, its larger and stronger teeth, wider and straighter aperture, and its broader and deeper fossula (See Table I).

The type locality here selected of *Cypraea tigris lyncichroa* is Koko Head, Oahu (21°15' N. Lat., 157°43' W. Long.), with a probable range extending throughout the entire chain of eight Hawaiian Islands.

The hypotype was collected in 48 feet of water on an openly exposed lava substrate by Paul Fujimoto in March 1957. It will be deposited in the type collection of the Bernice P. Bishop Museum, Honolulu, Hawaii, where it will bear the catalog number 212'885.

In order to conserve a scientific name of long standing and to avoid complicating the literature, Melvill's subspecific name is here-with retained for this Hawaiian race. Further study will be necessary to determine how far westward the morphological influence of this subspecies extends and where it intergrades and overlaps with *Cypraea tigris pardalis* Shaw. It is reasonable to assume, however, that in this newly redescribed subspecies are to be found the elements of speciation Melvill must have had in mind when he noted a great variability of color in the shells of the central Pacific waters.

While no attempt is being made in this paper to use color as an identifying criterion in the description, it should be pointed out that in the Hawaiian area, the dorsal spotting retains a remarkable degree of constancy in the manner of its appearance. The large spots on a relatively plain dorsum, with a minimum of clouding or suffusing, are particularly striking.

It is of further significance that, unlike its related subspecies, *Cypraea tigris lyncichroa* survives and maintains itself in a deep-water habitat. Few records exist of its ever having been collected alive intertidally. Within the limits of the presently considered range, the Hawaiian Islands, it has been noted by observant collectors that *C. t. lyncichroa* varies in its ecological requirements from one island to the next. It is usually found in approximately ten feet at Hawaii, the southernmost station considered here; in 15 to 20 feet near Maui, and in 25 to 40 feet around Oahu, still farther north. The smaller shells seem to come from the shallow localities in the southern end of the range, medium-sized ones from the intermediate depths of mid-range, and the largest known in the world from the deep-water Oahu stations. Unlike most other *Cypraea* of nocturnal habits, *C. t. lyncichroa* is less shy, remaining boldly

out in the open during daylight hours. It has been further noted that animals of this subspecies are usually to be found in pairs.

The animal of *Cypraea tigris lyncichroa* has a snow-white mantle that is variously covered with medium brown blotches which increase to a very dark brown at the center. The paintbrush tips of the numerous brown papillae are flecked with white.

Kay (1957) has described the stomach contents as algae and sponge.

The subspecies *lyncichroa* is found uncommonly in Hawaii, and its life history there is vague. Four early conchological works, Marten & Langkavel (1871), Baldwin (1898), Garrett (1879), and Hidalgo (1906) record this shell in Hawaii before 1906, but these reports are regarded by Schilder (1933) as doubtful. The first authentic mention of the subspecies is by Harris (1935) who reported that Edward K. Nihipali, an Hawaiian fisherman, had in 1929 collected one of the largest specimens on record, 5 $\frac{3}{4}$ " long. This specimen was collected alive on the edge of the reef at Hauula, Oahu, in six feet of water. *Cypraea tigris lyncichroa* is not known to exist in the late Hawaiian Pleistocene.

Acknowledgment

It is with a great deal of personal warmth and appreciation that I acknowledge the help given me in the preparation of this paper by my friend and co-worker Clifton S. Weaver of Honolulu. Special thanks are also given to Mrs. John Q. Burch for access to reference material in her library. The photographs are by Lowell Weymouth.

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Figure 1

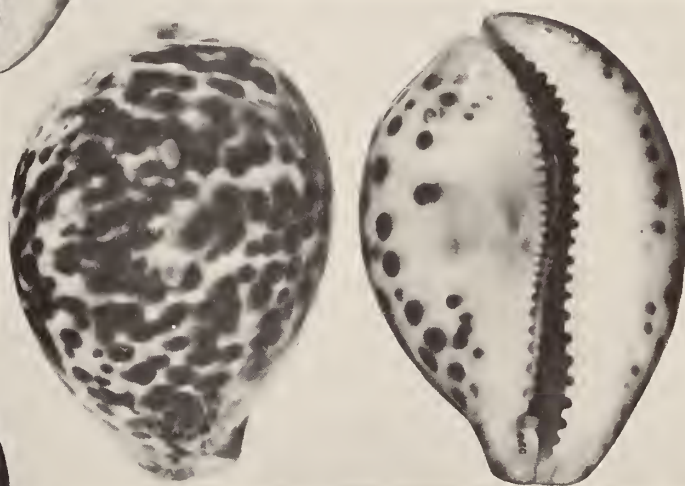


Figure 2

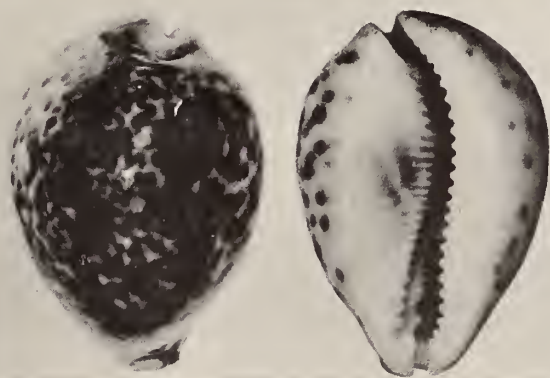


Figure 3

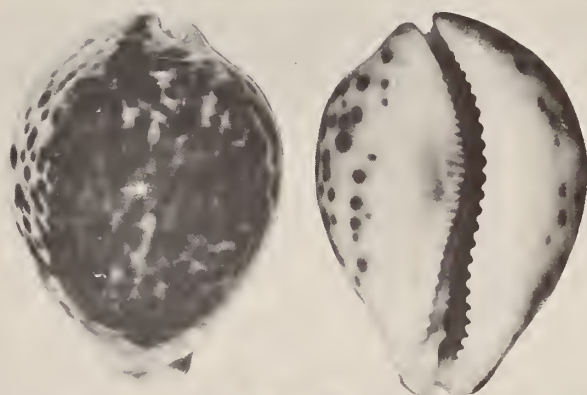


Figure 4

Dorsal and Ventral Aspect of Hypotypes:

Figure 1: *Cypraea tigris lyncichroa* MELVILL, 1888

Figure 2: *Cypraea tigris lyncichroa* MELVILL, 1888

Figure 3: *Cypraea tigris tigris* LINNAEUS, 1758

Figure 4: *Cypraea tigris tigris* LINNAEUS, 1758